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Effects of quantum interference on Moessbauer gamma transitions

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Abstract

In recent years there become actual the studies of quantum interference on gamma spectroscopic transitions induced by coherent perturbations. A special attention is paid to gamma transitions in compound (electron-nuclear) systems. In this work it is shown that quantum interference effects (QIE) occur in gamma quantum spontaneous emission spectrum of an electron-nuclear paramagnetic system when electron spin resonance is induced. Occurrence of QIE is connected to preparation of the quantum system initial state. The role of electron relaxation is defined: increase of relaxation rate (as it approaches the Rabi frequency) leads to extinguishing of QIE. The cases of stationary excitation of Moessbauer levels by wide and narrow spectra are considered.